



# Federal Emergency Management Agency

Washington, D.C. 20472

February 20, 2018

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

The Honorable Craig Cates  
Mayor, City of Key West  
P. O. Box 1409  
Key West, FL 33041

IN REPLY REFER TO:

Case No.: 18-04-1325P  
Community Name: City of Key West, FL  
Community No.: 120168  
Effective Date of  
This Revision: July 5, 2018

Dear Mayor Cates:

The Flood Insurance Rate Map (FIRM) for your community has been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are attached that provide information regarding this LOMR. Please see the List of Attachments below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Atlanta, Georgia, at (770) 220-5406, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at <https://www.fema.gov/national-flood-insurance-program>.

Sincerely,

Patrick "Rick" F. Sacbibit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration

List of Attachments:

Letter of Map Revision Determination Document  
Annotated Flood Insurance Rate Maps

cc: Mr. James K. Scholl  
City Manager  
City of Key West

Mr. Scott G. Fraser, CFM  
Floodplain Administrator  
City of Key West

Mr. Peter Batty  
President  
iCAMCO, Inc.

Mr. Stephen L. Markey, P.E.  
Principal Engineer  
SLiM Engineering, Inc.





# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Key West Monroe County Florida	NO PROJECT	COASTAL ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 120168		
IDENTIFIER	Key West Beach Club	APPROXIMATE LATITUDE AND LONGITUDE: 24.549, -81.782 SOURCE: Precision Mapping Streets      DATUM: NAD 83	
ANNOTATED MAPPING ENCLOSURES		ANNOTATED STUDY ENCLOSURES	
TYPE: FIRM*      NO.: 12087C1516K      DATE: February 18, 2005 TYPE: FIRM      NO.: 12087C1517K      DATE: February 18, 2005		NO REVISION TO THE FLOOD INSURANCE STUDY REPORT	

Enclosures reflect changes to flooding sources affected by this revision.

\* FIRM - Flood Insurance Rate Map

### FLOODING SOURCE AND REVISED REACH

Atlantic Ocean to Hawk Channel - an area centered at approximately 110 feet southeast of the intersection of Atlantic Boulevard and Leon Street

### SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Atlantic Ocean to Hawk Channel	Zone VE	Zone AE	NONE	YES
	BFEs*	BFEs	NONE	YES

\* BFEs - Base Flood Elevations

### DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <https://www.fema.gov/national-flood-insurance-program>.

Patrick "Rick" F. Sacbabit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

### COMMUNITY INFORMATION

#### APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

#### COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance stillwater elevations computed in the FIS for your community. A comprehensive restudy of your community's flood hazards could establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jesse Munoz  
Director, Mitigation Division  
Federal Emergency Management Agency, Region IV  
Koger Center - Rutgers Building, 3003 Chamblee Tucker Road  
Atlanta, GA 30341  
(770)-220-5406

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <https://www.fema.gov/national-flood-insurance-program>.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



**Federal Emergency Management Agency**  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

**STATUS OF THE COMMUNITY NFIP MAPS**

We will not physically revise and republish the FIRM for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <https://www.fema.gov/national-flood-insurance-program>.

A handwritten signature in black ink, appearing to read "Rick F. Sacbibit", is located above the printed name.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



**Federal Emergency Management Agency**  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

**PUBLIC NOTIFICATION OF REVISION**

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below, and through FEMA's Flood Hazard Mapping website at [https://www.floodmaps.fema.gov/fhm/bfe\\_status/bfe\\_main.asp](https://www.floodmaps.fema.gov/fhm/bfe_status/bfe_main.asp).

**LOCAL NEWSPAPER**

Name: *Key West Citizen*

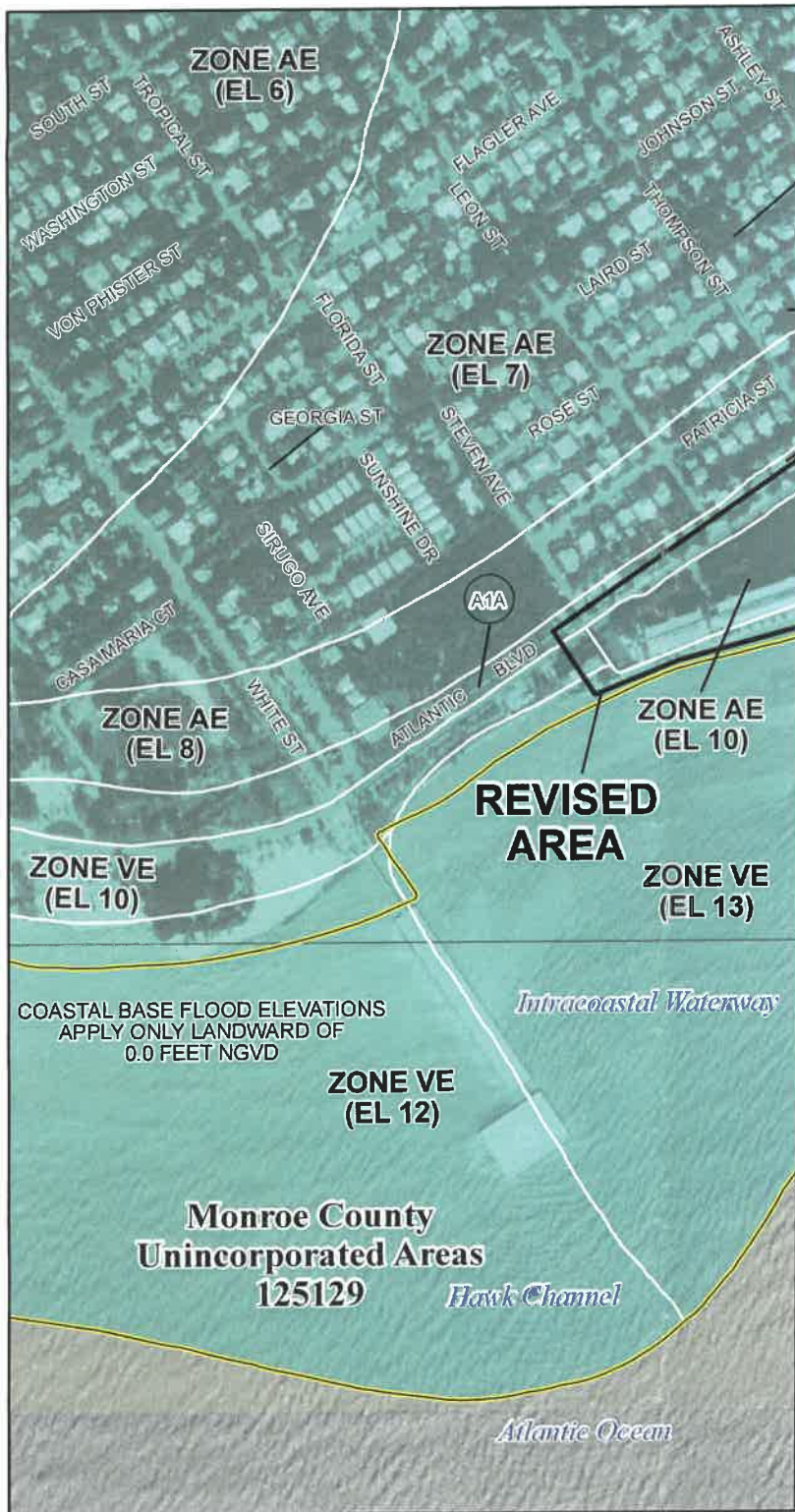
Dates: February 27, 2018 and March 6, 2018

Within 90 days of the second publication in the local newspaper, any interested party may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <https://www.fema.gov/national-flood-insurance-program>.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration





**City of Key West  
120168**

**ZONE AE  
(EL 9)**

JOINS PANEL 1517

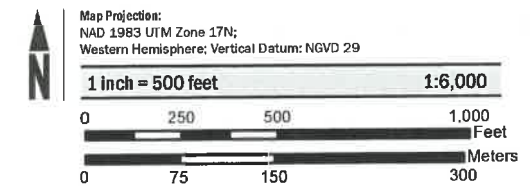
2715<sup>000M</sup>

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD		Regulatory Floodway
		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X

OTHER AREAS OF FLOOD HAZARD

## SCALE

NOTE: BASEMAP IMAGERY WAS OBTAINED FROM NAIP IN 2016



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**MONROE COUNTY, FLORIDA**  
and Incorporated Areas

**PANEL 1516 OF 1585**

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
KEY WEST, CITY OF	120168	1516	K
MONROE COUNTY	125129	1516	K

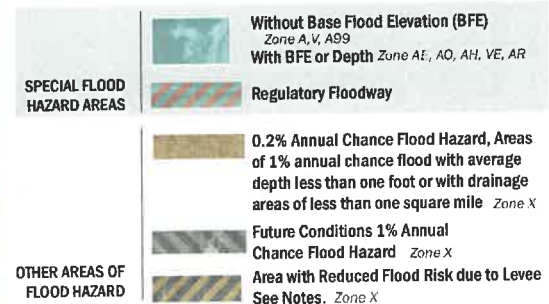
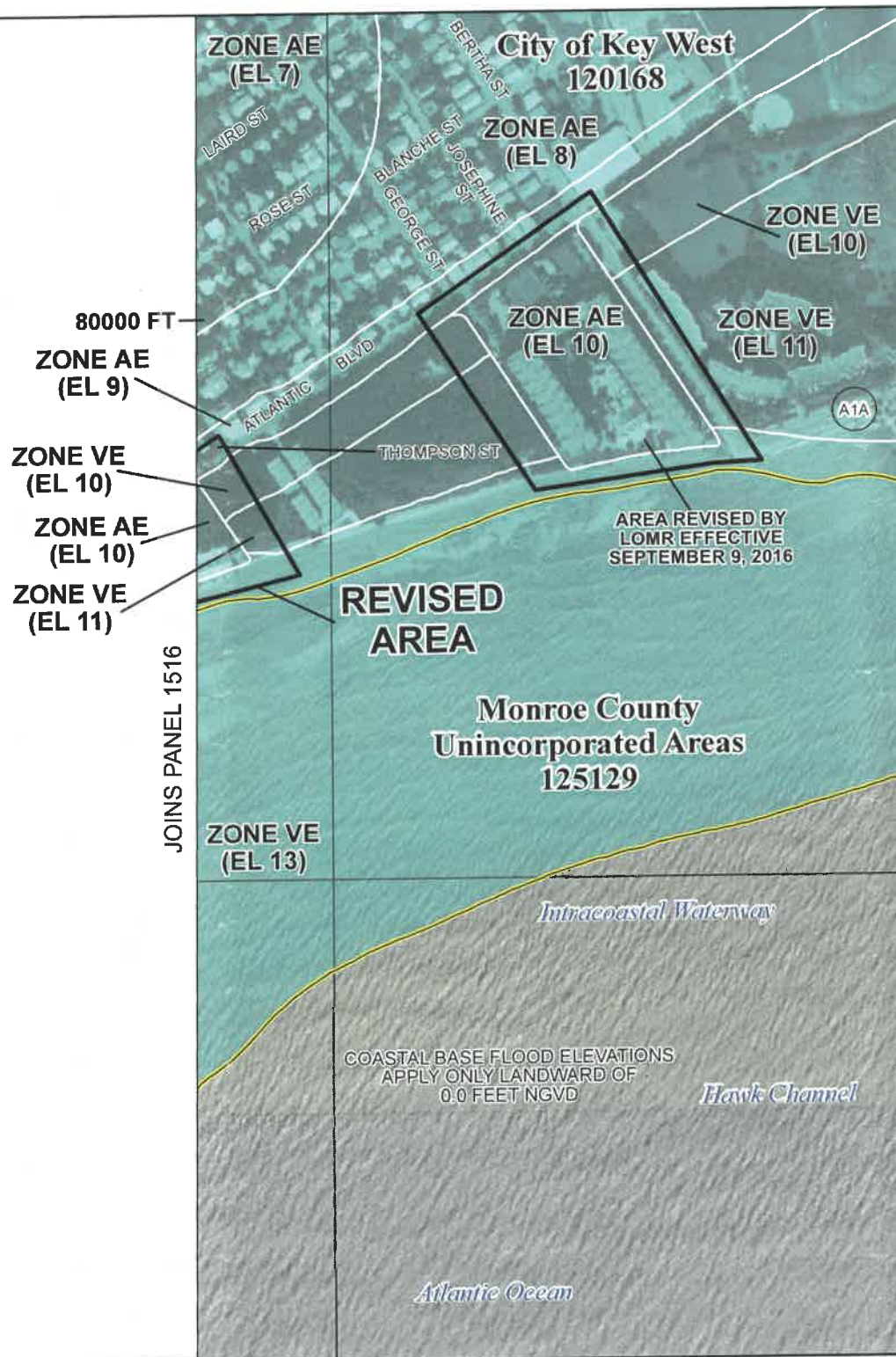
**REVISED TO REFLECT LOMR EFFECTIVE: July 5, 2018**

VERSION NUMBER  
**2.1.3.0**

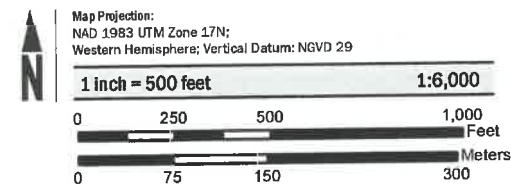
MAP NUMBER  
**12087C1516K**

MAP REVISED  
**FEBRUARY 18, 2005**





# **SCALE**



NOTE: BASEMAP IMAGERY WAS OBTAINED FROM NAIP IN 2016

**FEMA**

**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAP**

**MONROE COUNTY, FLORIDA and Incorporated Areas**

**PANEL 1517 OF 1585**

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
KEY WEST, CITY OF	120168	1517	K
MONROE COUNTY	125129	1517	K

**REVISED TO REFLECT LOMR EFFECTIVE: July 5, 2018**

VERSION NUMBER  
**2.1.3.0**

MAP NUMBER  
**12087C1517K**

MAP REVISED  
**FEBRUARY 18, 2005**

# SLIM ENGINEERING INC.

CIVIL ENGINEERING SERVICES  
Certificate of Authorization #30200  
305-509-2647 ♦ [steve.markey@SlimEngineering.com](mailto:steve.markey@SlimEngineering.com)  
[www.SlimEngineering.com](http://www.SlimEngineering.com)

November 30, 2017

LOMC Clearinghouse  
3601 Eisenhower Avenue, Suite 500  
Alexandria, VA 22304-6426

**Re: Proposed FEMA Flood Map Revision  
Key West Beach Club Condominiums  
1500 Atlantic Blvd.  
Key West, FL – Monroe County  
Parcel ID #0064640-000301 through 0064640-000438**

To Whom It May Concern:

Please see the enclosed documents and digital files for a FEMA Letter of Map Revision (LOMR) Application MT-2 and backup data for the subject property listed above in Key West. As you will see in the supporting documents, we are proposing to modify the effective FEMA flood zone of this property, changing it from a VE10/VE11/VE13 zone to an AE10 zone. This proposed revision is based on new/improved topographic data, which was analyzed according to FEMA guidelines and processed with FEMA's Coastal Hazard Analysis Modeling Program (CHAMP) and the Wave Height Analysis for Flood Insurance Studies (WHAFFIS) program.

We respectfully submit this report for your review and approval. Please contact me by email or phone if you have any questions or concerns.

Sincerely,

*Enclosure*



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Stephen L. Markey, P.E  
Principal Engineer, FL PE #74560



# FEMA Letter of Map Revision (LOMR) Application FORM MT-2

## Key West Beach Club Condominiums

1500 Atlantic Blvd., Key West, FL

Community: City of Key West / Monroe County

FIRM Map Panel: 1516K & 1517K

### **Prepared By:**

Stephen L. Markey, P.E.

SLiM Engineering, Inc

257 Venetian Way

Summerland Key, FL 33042

November 2017

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### PROJECT SUMMARY

1. Narrative
2. CHAMP Modeling Inputs
3. CHAMP Results & Map Revision

### APPENDIX

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5. Current FEMA Flood Zone Maps
6. CHAMP Software Output and Modeling Results
7. Topographic Map with Transects, Elevations, and Flood Zone Revisions
8. Proposed Flood Insurance Rate Map (FIRM) w/Revised Flood Zones

### FEMA Letter of Map Revision (LOMR) Application FORM MT-2:

- Overview and Concurrence Form (Form 1)
- Coastal Analysis Form (Form 4)

### Introduction

SLiM Engineering, Inc. was contacted by Key West Beach Club Condominium Association, Inc. about the possibility of modifying the effective FEMA FIRM (February 2005) for their property in Key West, FL., and was hired to provide site specific analysis and modeling to determine if amending the current FIRM from a VE zone to an AE zone was feasible.

Current elevation and site data was collected and analyzed in accordance with the *FEMA Guidelines and Specifications for Flood Hazard Mapping Partners, February 2007* and the Coastal Hazard Analysis Modeling Program (CHAMP) program was utilized to analyze the potential flooding conditions at the project site.

### Site Characteristics

The subject property is located along Hawk Channel on the Atlantic Ocean, at 1500 Atlantic Blvd., Key West, in Monroe County, FL. The property is approximately 725' wide along the shoreline to the south, 140' deep on the west side, and 325' deep on the east side, with a total area of approximately 3.65 ac.

The site has a narrow sand & bedrock beach that slopes at an approximate grade of 10%, with no frontal dune present on site. At the top of the beach is a small, partially failed riprap revetment, with an approximate width of 5'. Portions of the property on the east and west end of the project site have concrete seawalls with a riprap revetment base. According to current LIDAR data from the site and a shoreline survey by Island Surveying, Inc., dated February 8, 2010, elevations on site vary from +0.0' NGVD at the shoreline, to +5.2' NGVD further inland.

The primary flooding source occurs from the Atlantic Ocean across Hawk Channel. The 100-yr stillwater elevation at Hawk Channel along FEMA Transect #2 is shown in Table 2 of the Monroe County Flood Insurance Study (FIS) as +7.6' NGVD and Transect #4 is shown as +8.5' NGVD. Both stillwater elevations are noted as including the effects of wave setup. The 100-yr

stillwater elevations used for the Transects in this analysis were averaged between FEMA Transects #2 and #4.

According to the current FEMA FIRM (Panel 12087C1516K & 12087C1517K, 02/18/2005), the subject property is located within a VE flood zone with base elevations ranging from 10' NGVD to 13' NGVD. The *Current Fema Flood Zone Map* section in Appendix A shows the current FEMA FIRM and the location of the flood zones.



## CHAMP MODELING INPUTS

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To set up the General Conditions of the CHAMP model, parameters such as stillwater elevation (SWEL) values and wave setup values were averaged between the hydrologic data from Transect #2 and Transect #4 of the 2005 Effective FEMA FIS.

The project datum for this LOMR request was selected to match the project datum used in the effective FIS. The horizontal datum is the North American Datum of 1983 (NAD83), State Plane East. The vertical datum is the National Geodetic Vertical Datum of 1929 (NGVD29). All units are in feet. SWEL values and wave setup values were obtained from the FIS and input into CHAMP, as seen in Table 1.

<u>Parameter</u>	<u>Input</u>
10% SWEL	2.9 ft. NGVD
2% SWEL	5.2 ft. NGVD
1% SWEL	6.6 ft. NGVD
0.2% SWEL	6.9 ft. NGVD
1% Wave Setup	1.5 ft.
Mean High Water	1.16 ft. NGVD
Mean Low Water	-0.26 ft. NGVD
Fetch Length	24 Miles
Significant Wave Height	38.4 ft
Peak Period	13.2 s

*Table 1 – Summary of CHAMP inputs*

The wave data in Table 1 was obtained from the USACE Wave Information Studies (WIS) Station database. WIS Station 63498 was selected due to its location relative to the subject site and because the data was the most conservative compared to other nearby stations. Figure 1 shows the Significant Wave Height data obtained from the WIS Station. The data is

extrapolated by means of a linear fit line in order to determine the results for a 100-yr return period. Equation 1, obtained from the United States Army Corps of Engineers (USACE) Shore Protection Manual 1984 (SPM 1984 – Equation 3-64) was utilized to calculate the 100-yr Peak Period (T).

$$T = 12.1 \sqrt{\frac{H_s}{g}} \quad (\text{USACE Eq. 3-64})$$

where:

$T$  = Peak Period (s)

$H_s$  = Significant Wave Height (m)

$g$  = gravity constant (9.8 m/sec<sup>2</sup>)

Converting from metric to imperial units gives the equation:

$$T = 2.13 \sqrt{H_s} \quad (\text{Eq. 1})$$

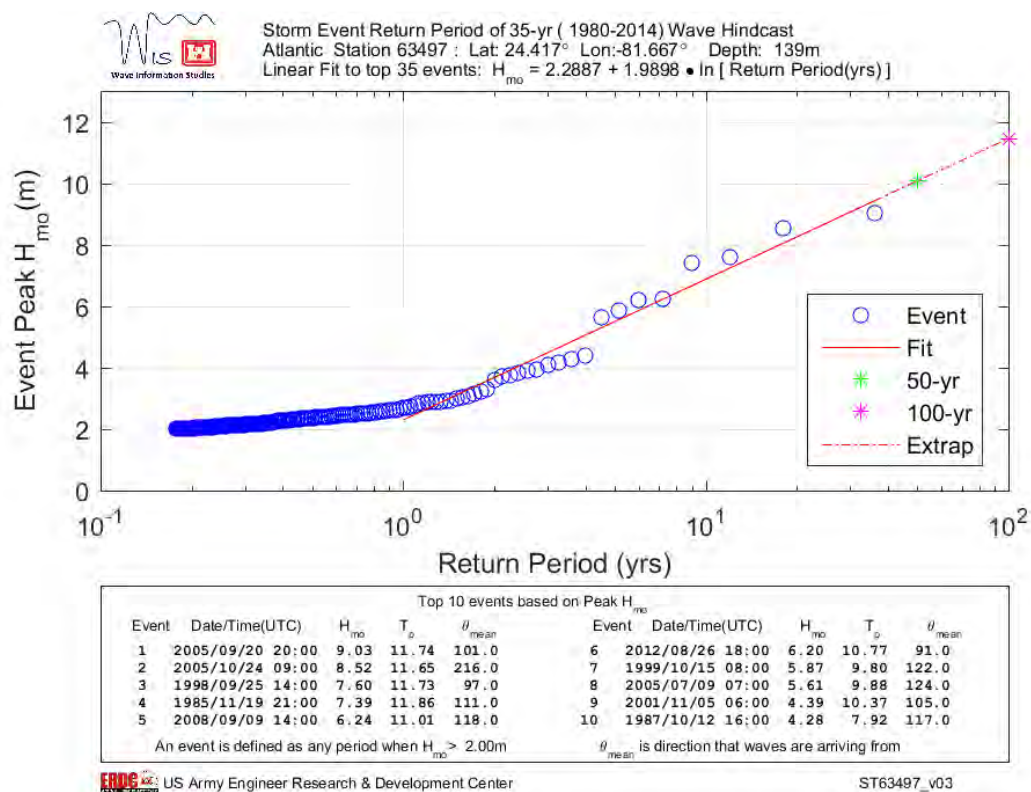


Figure 1 – Significant Wave Height Data, WIS Station 63498

### Transect Locations

Three transects were created for the CHAMP program to specifically model the coastal flooding conditions at the project site. The transect locations were chosen to represent the local features of the project, including buildings, vegetation, riprap revetments, seawalls, topographic features, and open water and land changes for inputs into the WHAFIS portion of the CHAMP model. The transects are located along the Atlantic Ocean and originate from offshore at a point seaward of the breaker depth associated with the 100-year significant wave height, extending inland to a point landward of the existing structures on the project site and landward of the current effective VE flood zone lines.

### Erosion

The study area is within the Florida Keys, a coral rock archipelago, not subject to the effects of the open coast. There is a lack of loose sediment, no primary frontal dune, and wave induced erosion is not considered to be significant at this site, so the Erosion portion of the CHAMP Model was not executed. Additionally, the length of the project's shore consists of either a riprap revetment or a concrete seawall.

### Elevations

The LiDAR ground point data cloud utilized for this project was obtained through the National Oceanic and Atmospheric Administration (NOAA) Digital Coast Data Access Viewer. These data were collected by the National Oceanic Atmospheric Administration National Geodetic Survey Remote Sensing Division using a Riegl VQ820G system between the dates of 04/19/2016 and 04/25/2016. Custom processing of "2016 NGS Topobathy Lidar: Key West (FL)". Charleston, SC: NOAA Office for Coastal Management. Data was accessed Aug 05, 2017 at <https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=6246>.

The downloaded LiDAR data set was an LAS format file containing LIDAR point cloud data with 4,139,020 points. The data set was extracted from a larger classified data set and only includes points classified as Ground within the requested geographic bounds. The data was imported into AutoCad Civil 3D software and a Triangular Irregular Network (TIN) Surface was created from the data. All LiDAR data was analyzed and any outliers or false returns were

not used for calculations. The final data set utilized for the calculations herein was also compared to a shoreline survey conducted at the project site on February 8, 2010 by Island Surveying, Inc., to ensure that the data was reliable.



## CHAMP RESULTS & MAP REVISION

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A numerical re-analysis was performed using the established FEMA methodology with the site-specific topographic data. The analysis was based on the FEMA two-dimensional Wave Height Analysis for Flood Insurance Studies (WHAFIS) model. The RUNUP module was not used since the site was inundated with the total 100-year water level (100-year SWEL plus wave setup).

The results of the WHAFIS analysis show that the maximum wave height elevation was calculated to be 12.45 ft. and the peak wave period was calculated to be 12.3 sec, for all three transects. The resulting Base Flood Elevations and inland reach of the VE zone can be seen on the attached Modeling Results. In all cases, the revised VE/ AE flood line was located approximately along the +4.5 ft NGVD29 contour line located seaward of the subject building footprints.

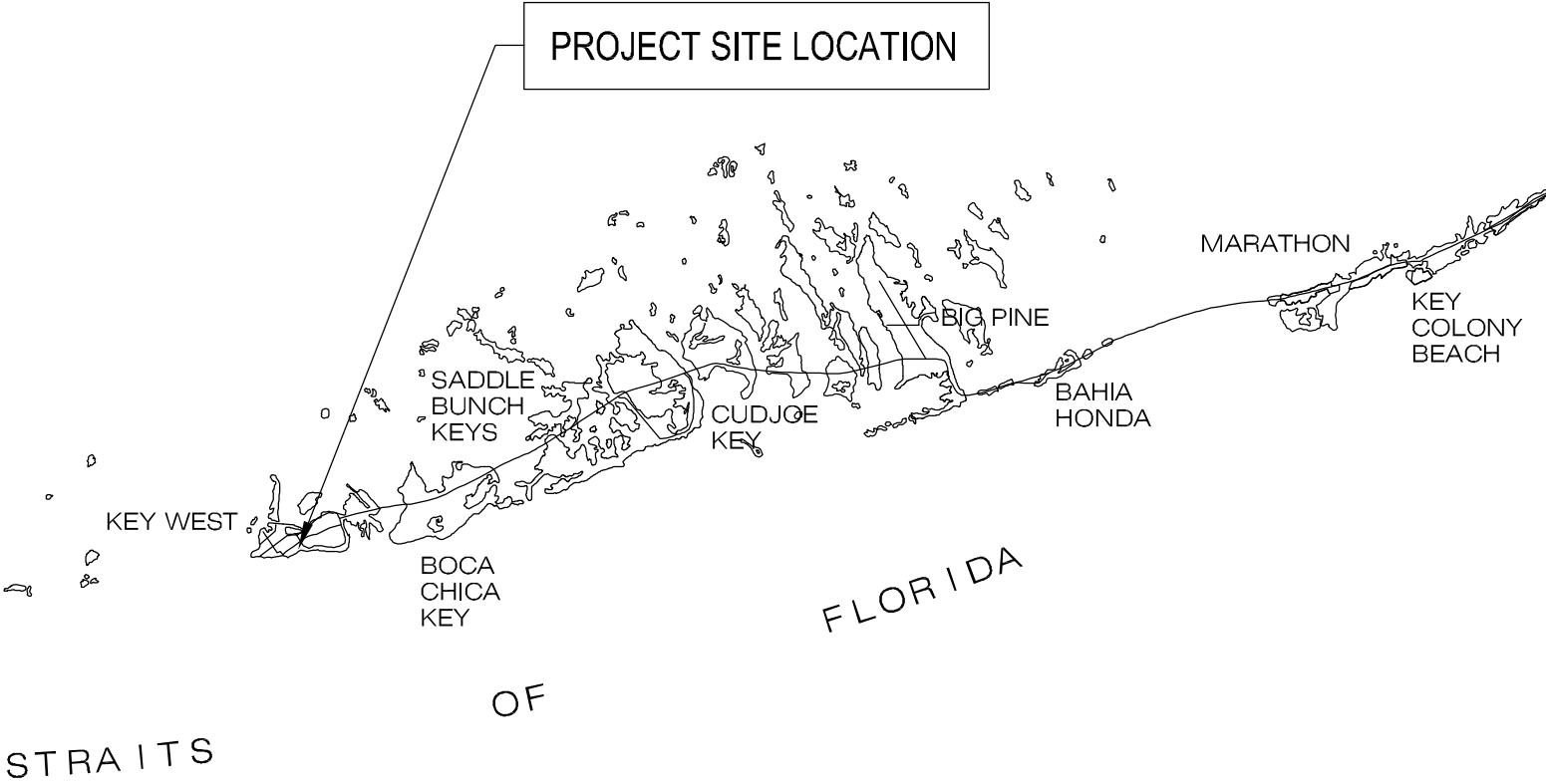
In conclusion, the results of this revised coastal analysis demonstrate that a portion of the existing VE zone has been modified and remapped as an AE zone for the subject site. Accordingly, the two subject buildings should be located in AE zone, as displayed on the attached Proposed FIRM in Appendix A. The subject building footprints are both located a minimum distance of approximately 12 ft landward of the VE/ AE gutter on the Proposed FIRM map, as shown in Table 2 below. It should be noted that, although the WHAFIS output produced multiple BFEs in the VE zone seaward of the V zone gutter, these proposed VE zone BFEs were increased to VE-13 in order to match the effective offshore BFE and to minimize multiple zone changes within a short span.

<u>Subject Property</u>	<u>Revised Flood Zone</u>	<u>BFE</u>	<u>Min Dist to VE Zone</u>
1500 Atlantic Blvd Key West Beach Club 1	AE	10 ft NGVD	12 ft
1500 Atlantic Blvd Key West Beach Club 2	AE	10 ft NGVD	12 ft

*Table 2 – Revised Flood Zone Summary*

## LOCATION MAP

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SHEET TITLE:  
LOCATION MAP

DRAWN BY:  
SLM  
REVIEWED BY:  
SLM

PROJECT NO:  
17-10  
SCALE:  
AS NOTED

CAD FILE:  
KW Beach Club LOMR (11-30-17).dwg  
SHEET SIZE:  
ANSI A (8½ x 11)

SHEET NUMBER:  
**G-1.0**  
SHEET 1 OF 3

DATE:  
NOVEMBER 30, 2017

**KEY WEST BEACH CLUB  
LOMR PROPOSAL**

1500 ATLANTIC BLVD  
KEY WEST, FL

**SLIM ENGINEERING** INC.  
CIVIL ENGINEERING SERVICES  
KEY WEST, FL  
(305) 509-2647  
CERTIFICATE OF AUTHORIZATION #30200

PLANS NOT VALID FOR CONSTRUCTION  
UNLESS SIGNED AND SEALED IN THIS BLOCK

STEPHEN L. MARKEY  
PROFESSIONAL ENGINEER  
LICENSE NO. 74560  
STATE OF FLORIDA

## **CURRENT FEMA FLOOD ZONE MAP**

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# National Flood Hazard Layer FIRMette

24°33'14.26"N

81°47'14.28"W



## Legend

- Cross-Sections
- Base Flood Elevations

## Flood Hazard Zones

- 1% Annual Chance Flood
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

## LOMRs

- Effective

## Map Panels

- Digital Data
- Unmodernized Maps
- Unmapped

This map complies with FEMA's standards for the use of digital flood maps. The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. The base map shown complies with FEMA's base map accuracy standards.

The NFHL is a living database, updated daily, and this map represents a snapshot of information at a specific time.

Flood risks are dynamic and can change frequently due to a variety of factors, including weather patterns, erosion, and new development. FEMA flood maps are continually updated through a variety of processes. Users should always verify through the Map Service Center (<http://msc.fema.gov>) or the Community Map Repository that they have the current effective information.

NFHL maps should not be created for unmapped or unmodernized areas.

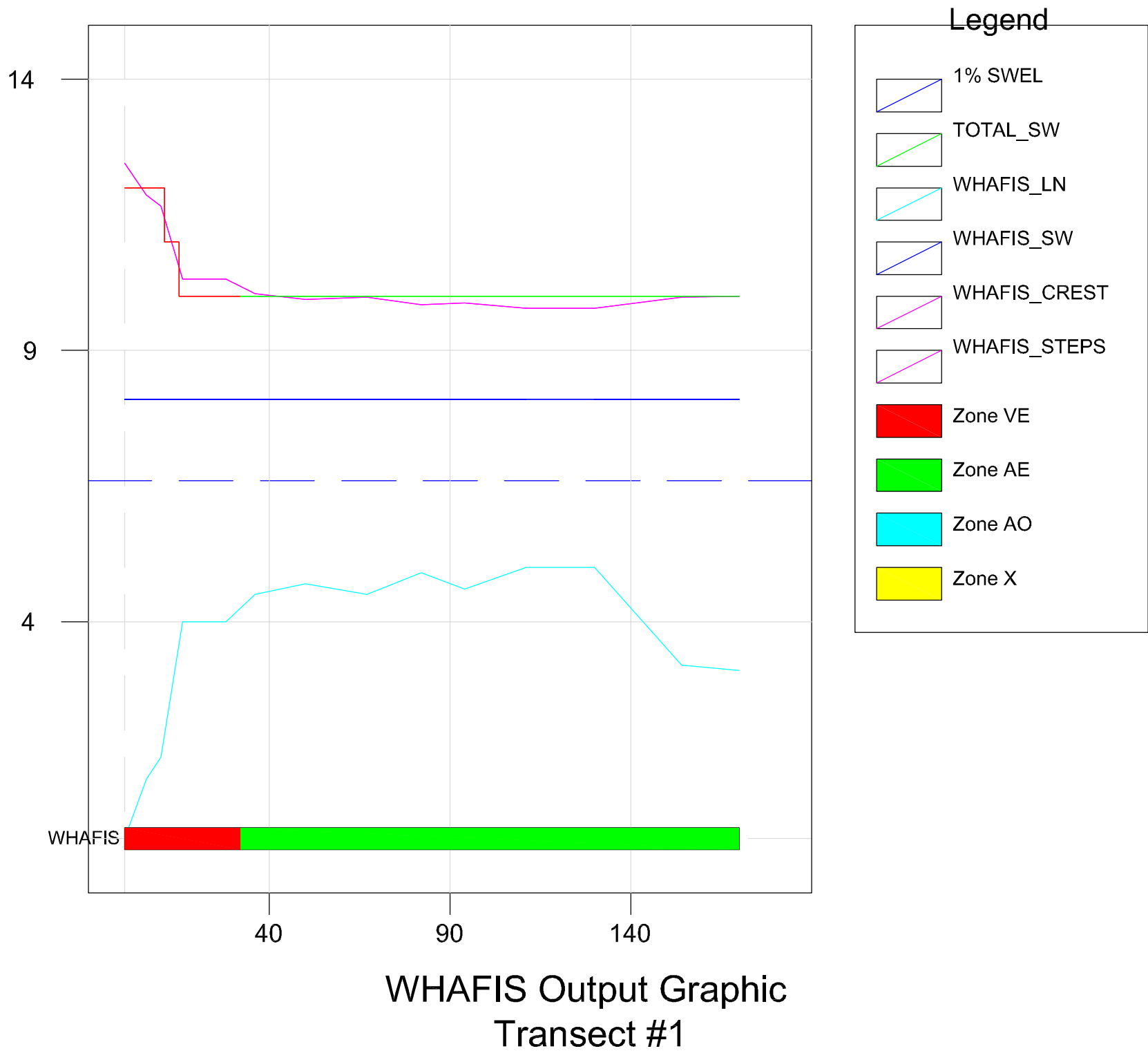


FEMA

Date: 12/1/2017 Time: 1:39:21 AM

## **CHAMP SOFTWARE OUTPUT AND MODELING RESULT**

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Transect #1 Output.txt

WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08\_2007)

Executed on: Thu Nov 30 23:45:11 2017

Input file: C:\Users\Steve\Dropbox\Engineering Projects\SLiM Projects\17-10-KW Beach Club LOMR\KW Beach Club LOMR (09-04-17)\w1.dat

Output file: C:\Users\Steve\Dropbox\Engineering Projects\SLiM Projects\17-10-KW Beach Club LOMR\KW Beach Club LOMR (09-04-17)\w1.out

- Transect: 1 Date: 11/30/2017

THIS IS A 100-YEAR CASE

PART1 INPUT

IE	0.000	0.000	24.000	2.900	8.100	53.000	12.300	0.000	0.182	0.000
IF	6.000	1.090	0.000	8.100	0.000	0.000	0.000	0.000	0.150	0.000
IF	10.000	1.500	0.000	8.100	0.000	0.000	0.000	0.000	0.291	0.000
IF	16.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.208	0.000
IF	22.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.000	0.000
IF	28.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.036	0.000
IF	36.000	4.500	0.000	8.100	0.000	0.000	0.000	0.000	0.032	0.000
IF	50.000	4.700	0.000	8.100	0.000	0.000	0.000	0.000	0.000	0.000
IF	67.000	4.500	0.000	8.100	0.000	0.000	0.000	0.000	0.006	0.000
IF	82.000	4.900	0.000	8.100	0.000	0.000	0.000	0.000	0.004	0.000
IF	94.000	4.600	0.000	8.100	0.000	0.000	0.000	0.000	0.003	0.000
IF	111.000	5.000	0.000	8.100	0.000	0.000	0.000	0.000	0.011	0.000
IF	130.000	5.000	0.000	8.100	0.000	0.000	0.000	0.000	-0.042	0.000
IF	154.000	3.200	0.000	8.100	0.000	0.000	0.000	0.000	-0.047	0.000
IF	170.000	3.100	0.000	8.100	0.000	0.000	0.000	0.000	-0.006	0.000
ET	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1

	END STATION	END ELEVATION	FETCH LENGTH	SURGE ELEV 10-YEAR	SURGE ELEV 100-YEAR	INITIAL WAVE HEIGHT	INITIAL W. PERIOD		BOTTOM SLOPE	AVERAGE A-ZONES
IE	0.000	0.000	24.000	2.900	8.100	53.000	12.300	0.000	0.182	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	6.000	1.090	0.000	8.100	0.000	0.000	0.000	0.000	0.150	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
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Transect #1 Output.txt										
IF	10.000	1.500	0.000	8.100	0.000	0.000	0.000	0.000	0.291	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	16.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.208	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	22.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.000	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	28.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.036	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	36.000	4.500	0.000	8.100	0.000	0.000	0.000	0.000	0.032	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	50.000	4.700	0.000	8.100	0.000	0.000	0.000	0.000	0.000	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	67.000	4.500	0.000	8.100	0.000	0.000	0.000	0.000	0.006	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	82.000	4.900	0.000	8.100	0.000	0.000	0.000	0.000	0.004	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	94.000	4.600	0.000	8.100	0.000	0.000	0.000	0.000	0.003	0.000

Transect #1 Output.txt

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	111.000	5.000	0.000	8.100	0.000	0.000	0.000	0.000	0.011	0.000
IF	130.000	5.000	0.000	8.100	0.000	0.000	0.000	0.000	-0.042	0.000
IF	154.000	3.200	0.000	8.100	0.000	0.000	0.000	0.000	-0.047	0.000
IF	170.000	3.100	0.000	8.100	0.000	0.000	0.000	0.000	-0.006	0.000

-----END OF TRANSECT-----

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

1

PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL  
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

	LOCATION	CONTROLLING WAVE HEIGHT	SPECTRAL PEAK WAVE PERIOD	WAVE CREST ELEVATION
IE	0.00	6.22	12.30	12.45
IF	6.00	5.39	12.30	11.87
IF	10.00	5.08	12.30	11.66
IF	16.00	3.17	12.30	10.32



Transect #1 Output.txt

IF	22.00	3.17	12.30	10.32
IF	28.00	3.17	12.30	10.32
IF	36.00	2.79	12.30	10.05
IF	50.00	2.63	12.30	9.94
IF	67.00	2.68	12.30	9.98
IF	82.00	2.48	12.30	9.84
IF	94.00	2.55	12.30	9.88
IF	111.00	2.40	12.30	9.78
IF	130.00	2.40	12.30	9.78
IF	154.00	2.69	12.30	9.98
IF	170.00	2.71	12.30	10.00

TRANSMITTED WAVE HEIGHT AT LAST FETCH OR OBSTRUCTION = 2.71 WHICH EXCEEDS 0.5.

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

NO AREAS ABOVE 100-YEAR SURGE IN THIS TRANSECT

PART4 LOCATION OF SURGE CHANGES

STATION	10-YEAR SURGE	100-YEAR SURGE
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NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

STATION OF GUTTER	LOCATION OF ZONE
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Transect #1 Output.txt

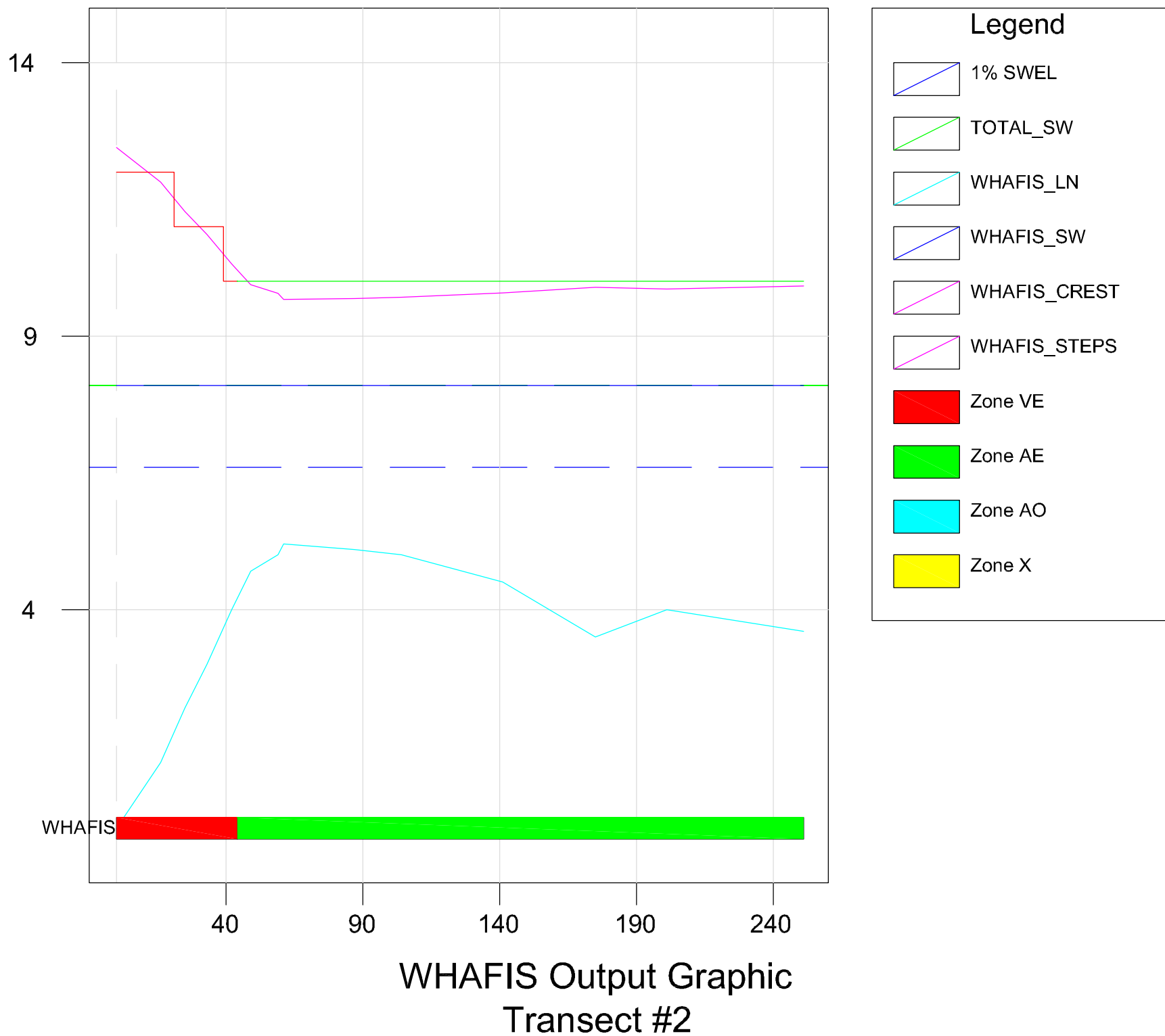
31.57                      WINDWARD

PART6 NUMBERED A ZONES AND V ZONES

STATION OF GUTTER	ELEVATION	ZONE DESIGNATION	FHF
0.00	12.45		
		V16 EL=12	80
10.70	11.50		
		V16 EL=11	80
15.19	10.50		
		V16 EL=10	80
31.57	10.20		
		A14 EL=10	70
170.00	10.00		

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES



Transect #2 Output.txt

WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08\_2007)

Executed on: Thu Nov 30 23:13:42 2017

Input file: C:\Users\Steve\Dropbox\Engineering Projects\SLiM Projects\17-10-KW Beach Club LOMR\KW Beach Club LOMR (09-04-17)\w2.dat

Output file: C:\Users\Steve\Dropbox\Engineering Projects\SLiM Projects\17-10-KW Beach Club LOMR\KW Beach Club LOMR (09-04-17)\w2.out

- Transect: 2 Date: 11/30/2017

THIS IS A 100-YEAR CASE

PART1 INPUT

IE	0.000	0.000	24.000	2.900	8.100	53.000	12.300	0.000	0.075	0.000
IF	16.000	1.200	0.000	8.100	0.000	0.000	0.000	0.000	0.088	0.000
IF	25.000	2.200	0.000	8.100	0.000	0.000	0.000	0.000	0.106	0.000
IF	33.000	3.000	0.000	8.100	0.000	0.000	0.000	0.000	0.106	0.000
IF	42.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.106	0.000
IF	49.000	4.700	0.000	8.100	0.000	0.000	0.000	0.000	0.059	0.000
IF	59.000	5.000	0.000	8.100	0.000	0.000	0.000	0.000	0.042	0.000
IF	61.000	5.200	0.000	8.100	0.000	0.000	0.000	0.000	0.004	0.000
IF	87.000	5.100	0.000	8.100	0.000	0.000	0.000	0.000	-0.005	0.000
IF	104.000	5.000	0.000	8.100	0.000	0.000	0.000	0.000	-0.011	0.000
IF	141.000	4.500	0.000	8.100	0.000	0.000	0.000	0.000	-0.021	0.000
IF	175.000	3.500	0.000	8.100	0.000	0.000	0.000	0.000	-0.008	0.000
IF	201.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.001	0.000
IF	251.000	3.600	0.000	8.100	0.000	0.000	0.000	0.000	-0.008	0.000
ET	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1

IE	END STATION	END ELEVATION	FETCH LENGTH	SURGE 10-YEAR	ELEV 100-YEAR	SURGE 100-YEAR	INITIAL WAVE HEIGHT	INITIAL W. PERIOD	BOTTOM SLOPE	AVERAGE A-ZONES
	0.000	0.000	24.000	2.900	8.100	53.000	12.300	0.000	0.075	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	16.000	1.200	0.000	8.100	0.000	0.000	0.000	0.000	0.088	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	25.000	2.200	0.000	8.100	0.000	0.000	0.000	0.000	0.106	0.000

Transect #2 Output.txt

IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	33.000	3.000	0.000	8.100					0.106	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	42.000	4.000	0.000	8.100					0.106	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	49.000	4.700	0.000	8.100					0.059	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	59.000	5.000	0.000	8.100					0.042	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	61.000	5.200	0.000	8.100					0.004	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	87.000	5.100	0.000	8.100					-0.005	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	104.000	5.000	0.000	8.100					-0.011	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	141.000	4.500	0.000	8.100					-0.021	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	175.000	3.500	0.000	8.100					-0.008	0.000

Transect #2 Output.txt										
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	201.000	4.000	0.000	8.100	0.000	0.000	0.000	0.000	0.001	0.000
IF	251.000	3.600	0.000	8.100	0.000	0.000	0.000	0.000	-0.008	0.000

-----END OF TRANSECT-----

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

1

PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL  
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

	LOCATION	CONTROLLING WAVE HEIGHT	SPECTRAL PEAK WAVE PERIOD	WAVE CREST ELEVATION
IE	0.00	6.22	12.30	12.45
IF	16.00	5.31	12.30	11.82
IF	25.00	4.55	12.30	11.28
IF	33.00	3.94	12.30	10.86
IF	42.00	3.17	12.30	10.32
IF	49.00	2.63	12.30	9.94
IF	59.00	2.40	12.30	9.78
IF	61.00	2.25	12.30	9.67
IF	87.00	2.28	12.30	9.69
IF	104.00	2.30	12.30	9.71

Transect #2 Output.txt				
IF	141.00	2.41	12.30	9.79
IF	175.00	2.56	12.30	9.89
IF	201.00	2.52	12.30	9.86
IF	251.00	2.60	12.30	9.92

TRANSMITTED WAVE HEIGHT AT LAST FETCH OR OBSTRUCTION = 2.60 WHICH EXCEEDS 0.5.

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

NO AREAS ABOVE 100-YEAR SURGE IN THIS TRANSECT

PART4 LOCATION OF SURGE CHANGES

STATION	10-YEAR SURGE	100-YEAR SURGE
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NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

STATION OF GUTTER	LOCATION OF ZONE
44.23	WINDWARD

PART6 NUMBERED A ZONES AND V ZONES

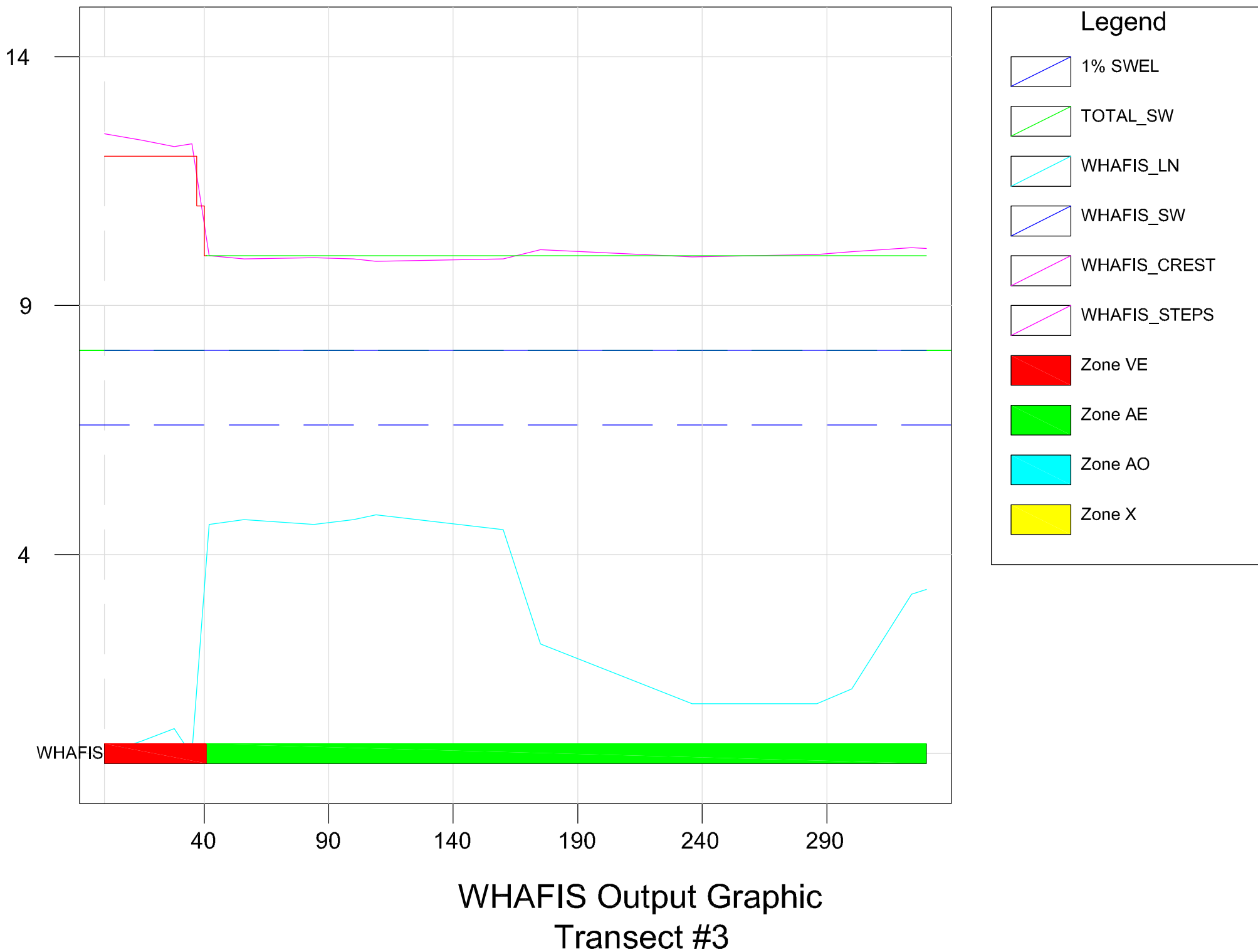
STATION OF GUTTER	ELEVATION	ZONE DESIGNATION	FHF
0.00	12.45		
		V16 EL=12	80
21.33	11.50		
		V16 EL=11	80



		Transect #2 Output.txt		
38.98	10.50			
		V16	EL=10	80
44.23	10.20			
		A14	EL=10	70
251.00	9.92			

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES



Transect #3 Output.txt

WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08\_2007)

Executed on: Thu Nov 30 23:16:35 2017

Input file: C:\Users\Steve\Dropbox\Engineering Projects\SLiM Projects\17-10-KW Beach Club LOMR\KW Beach Club LOMR (09-04-17)\w3.dat

Output file: C:\Users\Steve\Dropbox\Engineering Projects\SLiM Projects\17-10-KW Beach Club LOMR\KW Beach Club LOMR (09-04-17)\w3.out

- Transect: 3 Date: 11/30/2017

THIS IS A 100-YEAR CASE

PART1 INPUT

IE	0.000	0.000	24.000	2.900	8.100	53.000	12.300	0.000	0.017	0.000
IF	15.000	0.250	0.000	8.100	0.000	0.000	0.000	0.000	0.018	0.000
IF	28.000	0.500	0.000	8.100	0.000	0.000	0.000	0.000	-0.003	0.000
IF	32.000	0.200	0.000	8.100	0.000	0.000	0.000	0.000	-0.071	0.000
IF	35.000	0.000	0.000	8.100	0.000	0.000	0.000	0.000	0.440	0.000
IF	42.000	4.600	0.000	8.100	0.000	0.000	0.000	0.000	0.224	0.000
IF	56.000	4.700	0.000	8.100	0.000	0.000	0.000	0.000	0.000	0.000
IF	84.000	4.600	0.000	8.100	0.000	0.000	0.000	0.000	0.000	0.000
IF	100.000	4.700	0.000	8.100	0.000	0.000	0.000	0.000	0.008	0.000
IF	109.000	4.800	0.000	8.100	0.000	0.000	0.000	0.000	-0.003	0.000
IF	160.000	4.500	0.000	8.100	0.000	0.000	0.000	0.000	-0.039	0.000
IF	175.000	2.200	0.000	8.100	0.000	0.000	0.000	0.000	-0.046	0.000
IF	236.000	1.000	0.000	8.100	0.000	0.000	0.000	0.000	-0.011	0.000
IF	286.000	1.000	0.000	8.100	0.000	0.000	0.000	0.000	0.005	0.000
IF	300.000	1.300	0.000	8.100	0.000	0.000	0.000	0.000	0.058	0.000
IF	324.000	3.200	0.000	8.100	0.000	0.000	0.000	0.000	0.067	0.000
IF	330.000	3.300	0.000	8.100	0.000	0.000	0.000	0.000	0.017	0.000
ET	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1

	END STATION	END ELEVATION	FETCH LENGTH	SURGE 10-YEAR	ELEV 100-YEAR	SURGE 100-YEAR	INITIAL WAVE HEIGHT	INITIAL W. PERIOD		BOTTOM SLOPE	AVERAGE A-ZONES
IE	0.000	0.000	24.000	2.900	8.100	53.000	12.300	0.000		0.017	0.000
IF	15.000	0.250	0.000	8.100	0.000	0.000	0.000	0.000		0.018	0.000

Transect #3 Output.txt

IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	28.000	0.500	0.000	8.100					-0.003	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	32.000	0.200	0.000	8.100					-0.071	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	35.000	0.000	0.000	8.100					0.440	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	42.000	4.600	0.000	8.100					0.224	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	56.000	4.700	0.000	8.100					0.000	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	84.000	4.600	0.000	8.100					0.000	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	100.000	4.700	0.000	8.100					0.008	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	109.000	4.800	0.000	8.100					-0.003	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	0.000	0.000	0.000	0.000	BOTTOM SLOPE	AVERAGE A-ZONES
	160.000	4.500	0.000	8.100					-0.039	0.000

Transect #3 Output.txt

IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	175.000	2.200	0.000	8.100	0.000	0.000	0.000	0.000	-0.046	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	236.000	1.000	0.000	8.100	0.000	0.000	0.000	0.000	-0.011	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	286.000	1.000	0.000	8.100	0.000	0.000	0.000	0.000	0.005	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	300.000	1.300	0.000	8.100	0.000	0.000	0.000	0.000	0.058	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	324.000	3.200	0.000	8.100	0.000	0.000	0.000	0.000	0.067	0.000
IF	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
	330.000	3.300	0.000	8.100	0.000	0.000	0.000	0.000	0.017	0.000

-----END OF TRANSECT-----

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

1

PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL

Transect #3 Output.txt  
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

LOCATION		CONTROLLING WAVE HEIGHT	SPECTRAL PEAK WAVE PERIOD	WAVE CREST ELEVATION
IE	0.00	6.22	12.30	12.45
IF	15.00	6.03	12.30	12.32
IF	28.00	5.84	12.30	12.19
IF	32.00	5.90	12.30	12.23
IF	35.00	5.93	12.30	12.25
IF	42.00	2.71	12.30	10.00
IF	56.00	2.63	12.30	9.94
IF	84.00	2.66	12.30	9.96
IF	100.00	2.63	12.30	9.94
IF	109.00	2.56	12.30	9.89
IF	160.00	2.63	12.30	9.94
IF	175.00	2.89	12.30	10.12
IF	236.00	2.69	12.30	9.98
IF	286.00	2.75	12.30	10.03
IF	300.00	2.83	12.30	10.08
IF	324.00	2.94	12.30	10.16
IF	330.00	2.93	12.30	10.15

TRANSMITTED WAVE HEIGHT AT LAST FETCH OR OBSTRUCTION = 2.93 WHICH EXCEEDS 0.5.

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

Transect #3 Output.txt

NO AREAS ABOVE 100-YEAR SURGE IN THIS TRANSECT

PART4 LOCATION OF SURGE CHANGES

STATION	10-YEAR SURGE	100-YEAR SURGE
---------	---------------	----------------

NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

STATION OF GUTTER	LOCATION OF ZONE
-------------------	------------------

41.37	WINDWARD
-------	----------

PART6 NUMBERED A ZONES AND V ZONES

STATION OF GUTTER	ELEVATION	ZONE DESIGNATION	FHF
-------------------	-----------	------------------	-----

0.00	12.45		
		V16 EL=12	80
37.34	11.50		
		V16 EL=11	80
40.44	10.50		
		V16 EL=10	80
41.37	10.20		
		A14 EL=10	70
330.00	10.15		



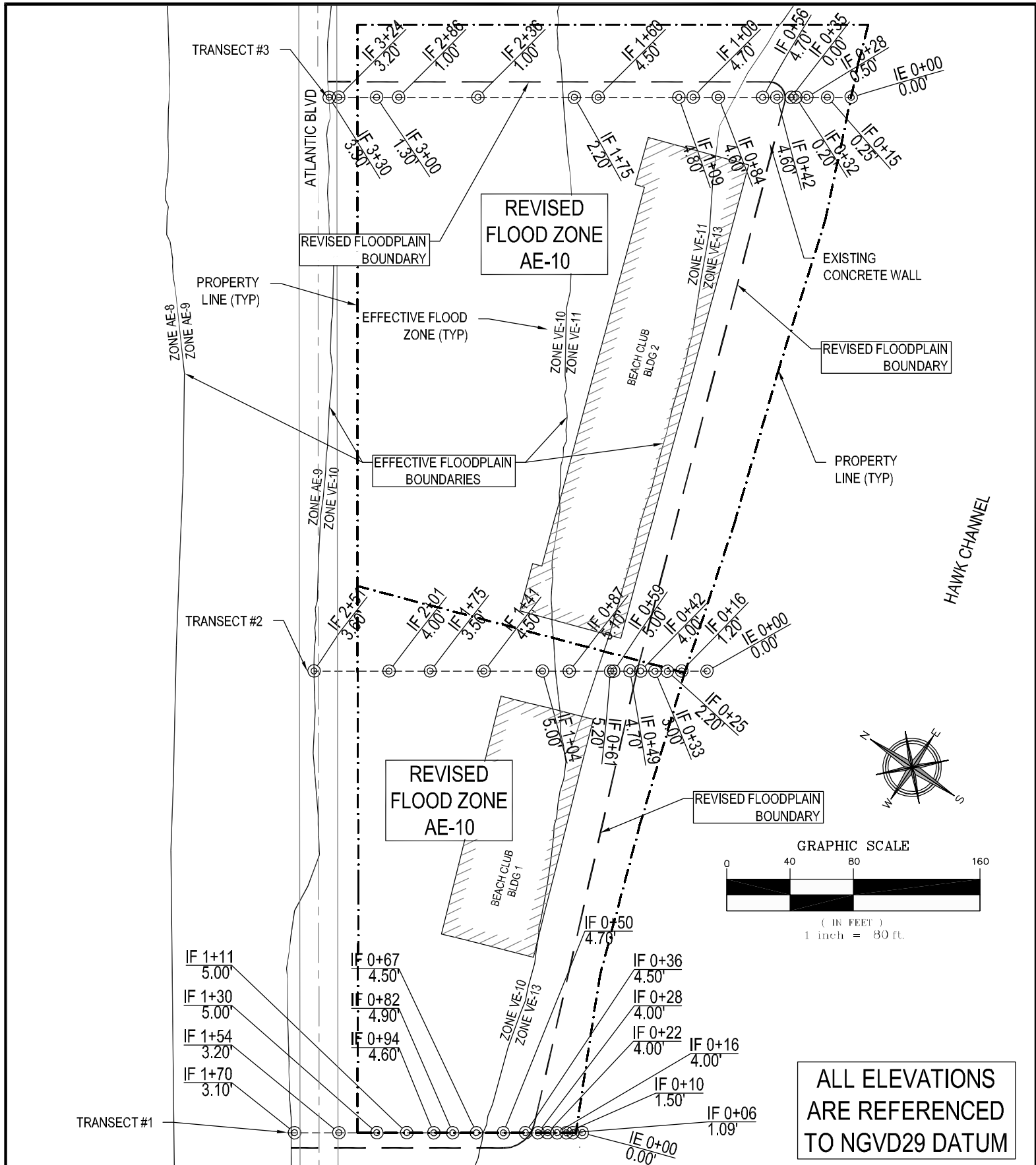
Transect #3 Output.txt

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES

**TOPOGRAPHIC MAP WITH TRANSECTS,  
ELEVATIONS, AND FLOOD ZONE REVISIONS**

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SHEET TITLE:  
TOPOGRAPHIC MAP

DRAWN BY:  
SLM

PROJECT NO.:  
17-10

CAD FILE:  
KW Beach Club LOMR (11-30-17).dwg

SHEET NUMBER:  
**C-1.0**  
SHEET 2 OF 3

REVIEWED BY:  
SLM

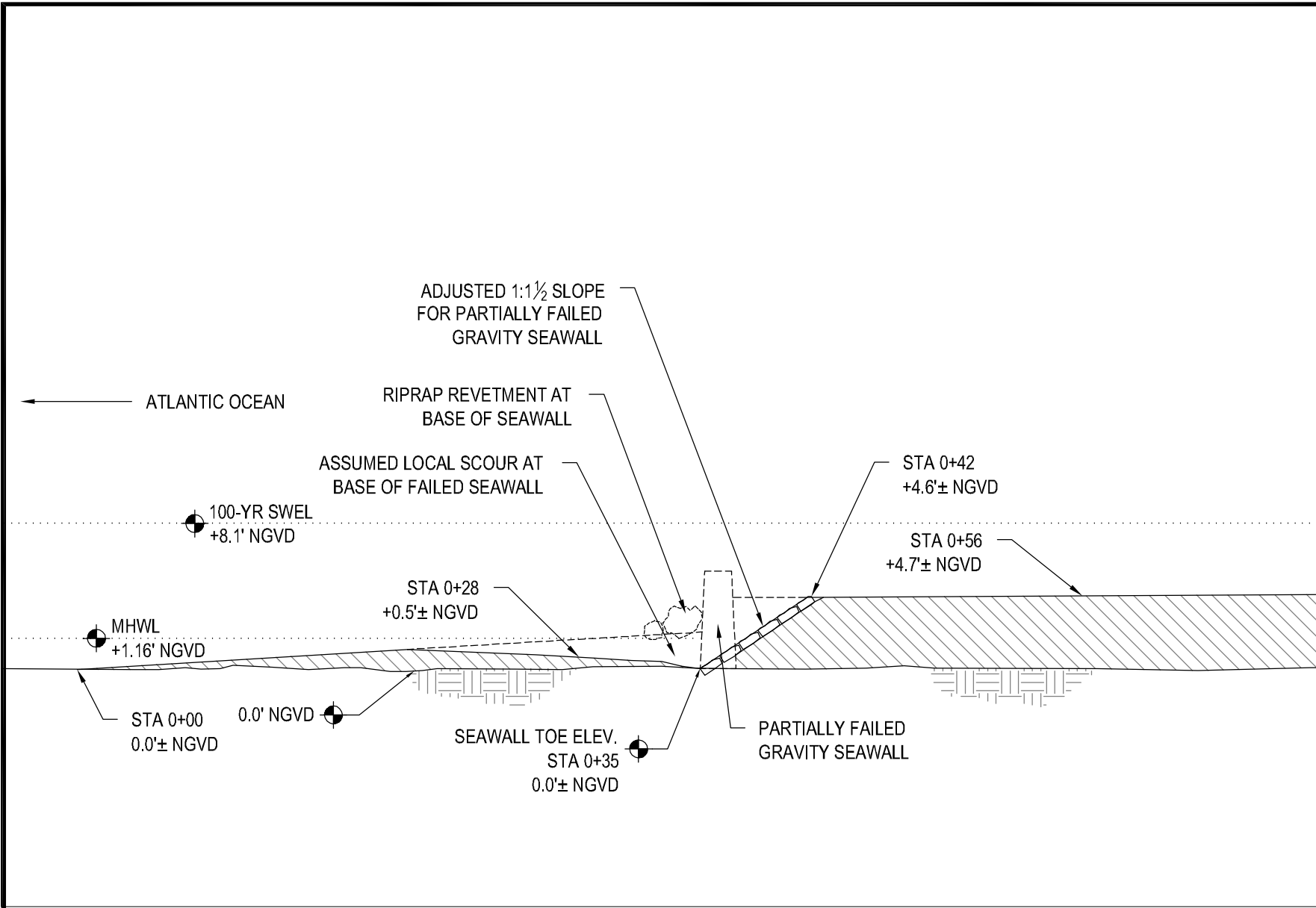
# KEY WEST BEACH CLUB LOMR PROPOSAL

1500 ATLANTIC BLVD  
KEY WEST, FL

DATE:  
NOVEMBER 30, 2017

**SLM ENGINEERING INC.**  
CIVIL ENGINEERING SERVICES  
KEY WEST, FL  
(305) 509-2647  
CERTIFICATE OF AUTHORIZATION #30200

PLANS NOT VALID FOR CONSTRUCTION  
UNLESS SIGNED AND SEALED IN THIS BLOCK  
STEPHEN L. MARKEY  
PROFESSIONAL ENGINEER  
LICENSE NO. 74560  
STATE OF FLORIDA



TRANSECT #3 SECTION VIEW  
WITH PARTIALLY FAILED SEAWALL

**SLIM ENGINEERING** INC.

CIVIL ENGINEERING SERVICES

KEY WEST, FL  
(305) 509-2647

CERTIFICATE OF AUTHORIZATION #30200

PLANS NOT VALID FOR CONSTRUCTION  
UNLESS SIGNED AND SEALED BY  
STEPHEN J. MARKLEY  
PROFESSIONAL ENGINEER  
LICENSE NO. 74560  
STATE OF FLORIDA

CAD FILE: KW Beach Club LOMR (11-30-17).dwg  
SHEET SIZE: ANSI A (8½ x 11)

DRAWN BY: SLM  
REVIEWED BY: SLM  
PROJECT NO: 17-10  
SCALE: AS NOTED

SHEET TITLE: TRANSECT #3  
SECTION VIEW

KEY WEST BEACH CLUB  
LOMR PROPOSAL

1500 ATLANTIC BLVD  
KEY WEST, FL

SHEET NUMBER: C-1.1  
SHEET 3 OF 3

DATE: NOVEMBER 30, 2017

**PROPOSED FLOOD INSURANCE RATE MAP (FIRM)  
W/REVISED FLOOD ZONES**

---



# National Flood Hazard Layer FIRMette

24°33'14.26"N

81°47'14.28"W



## Legend

- Cross-Sections
- Base Flood Elevations

## Flood Hazard Zones

- 1% Annual Chance Flood
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

## LOMRs

- Effective

## Map Panels

- Digital Data
- Unmodernized Maps
- Unmapped

This map complies with FEMA's standards for the use of digital flood maps. The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. The base map shown complies with FEMA's base map accuracy standards.

The NFHL is a living database, updated daily, and this map represents a snapshot of information at a specific time.

Flood risks are dynamic and can change frequently due to a variety of factors, including weather patterns, erosion, and new development. FEMA flood maps are continually updated through a variety of processes. Users should always verify through the Map Service Center (<http://msc.fema.gov>) or the Community Map Repository that they have the current effective information.

NFHL maps should not be created for unmapped or unmodernized areas.



FEMA

Date: 12/1/2017 Time: 1:39:21 AM

**FEMA LETTER OF MAP REVISION (LOMR)  
APPLICATION FORM MT-2**

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U.S. DEPARTMENT OF HOMELAND SECURITY  
FEDERAL EMERGENCY MANAGEMENT AGENCY  
**OVERVIEW & CONCURRENCE FORM**

*O.M.B No. 1660-0016*  
*Expires February 28, 2014*

**PAPERWORK BURDEN DISCLOSURE NOTICE**

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

**PRIVACY ACT STATEMENT**

**AUTHORITY:** The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

**PRINCIPAL PURPOSE(S):** This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

**ROUTINE USE(S):** The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

**DISCLOSURE:** The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

**A. REQUESTED RESPONSE FROM DHS-FEMA**

This request is for a (check one):

- ☐ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- ☒ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

**B. OVERVIEW**

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
120168	City of Key West	FL	12087C	1516K	02/18/05
120168	City of Key West	FL	12087C	1517K	02/18/05

2. a. Flooding Source: Hawk Channel, Atlantic Ocean

- b. Types of Flooding: ☐ Riverine ☒ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
- ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Key West Beach Club

4. FEMA zone designations affected: VE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

- ☐ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
- ☐ Coastal Analysis ☐ Hydraulic Analysis ☐ Hydrologic Analysis ☐ Corrections
- ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
- ☒ New Topographic Data ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures:

☐ Channelization

☐ Levee/Floodwall

☐ Bridge/Culvert

☐ Dam

☐ Fill

☐ Other (Attach Description)

6. ☐ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

### C. REVIEW FEE

Has the review fee for the appropriate request category been included?

☐ Yes

Fee amount: \$ \_\_\_\_\_

☒ No, Attach Explanation

Please see the DHS-FEMA Web site at [http://www.fema.gov/plan/prevent/fhm/fm\\_fees.shtm](http://www.fema.gov/plan/prevent/fhm/fm_fees.shtm) for Fee Amounts and Exemptions.

### D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: PETER BATTY

Company: iCAMCO, Inc

Mailing Address: 3438 Duck Ave  
Key West, FL 33040

Daytime Telephone No.: 305-509-2647

Fax No.: -

E-Mail Address: steve.markey@slimengineering.com

Signature of Requester (required): [Signature]

Date: 11-30-17

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Mr. Scott Fraser, Floodplain Administrator

Community Name: City of Key West

Mailing Address:

P.O. Box 1409

Key West, FL 33041

Daytime Telephone No.: 305-809-3810

Fax No.:

E-Mail Address: sfraser@cityofkeywest-fl.gov

Community Official's Signature (required): [Signature]

Date: 01 Dec 2017

### CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Stephen L. Markey, P.E.

License No.: 74560

Expiration Date: 02/28/2019

Company Name: SLiM Engineering, Inc.

Telephone No.: 305-509-2647

Fax No.:

Signature: [Signature]

Date: 11-30-17

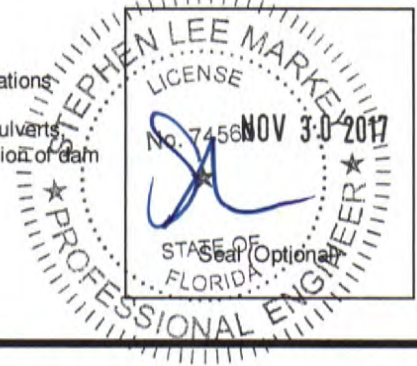
E-Mail Address: steve.markey@slimengineering.com

Ensure the forms that are appropriate to your revision request are included in your submittal.

**Form Name and (Number)**

**Required if ...**

- |  |  |
|--|--|
| <input type="checkbox"/> Riverine Hydrology and Hydraulics Form (Form 2) | New or revised discharges or water-surface elevations  |
| <input type="checkbox"/> Riverine Structures Form (Form 3)               | Channel is modified, addition/revision of bridge/culverts,<br>addition/revision of levee/floodwall, addition/revision of dam |
| <input checked="" type="checkbox"/> Coastal Analysis Form (Form 4)       | New or revised coastal elevations  |
| <input type="checkbox"/> Coastal Structures Form (Form 5)                | Addition/revision of coastal structure   |
| <input type="checkbox"/> Alluvial Fan Flooding Form (Form 6)             | Flood control measures on alluvial fans  |





DEPARTMENT OF HOMELAND SECURITY  
FEDERAL EMERGENCY MANAGEMENT AGENCY  
**COASTAL ANALYSIS FORM**

O.M.B No. 1660-0016  
Expires February 28, 2014

**PAPERWORK REDUCTION ACT**

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

**PRIVACY ACT STATEMENT**

**AUTHORITY:** The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

**PRINCIPAL PURPOSE(S):** This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

**ROUTINE USE(S):** The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

**DISCLOSURE:** The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Hawk Channel, Atlantic Ocean

**Note:** Fill out one form for each flooding source studied.

**A. COASTLINE TO BE REVISED**

Describe limits of study area: Between shoreline and Altantic Blvd, 825 to 1,500 ft east of White St. Pier

**B. EFFECTIVE FIS**

The area being revised in the effective FIS was studied by detailed methods using (check all that apply):

- |  |   |
|--|---|
| <input type="checkbox"/> Storm surge modeling                | <input type="checkbox"/> Wave setup computations                    |
| <input checked="" type="checkbox"/> Wave height computations | <input type="checkbox"/> Wave runup computations                    |
| <input type="checkbox"/> Wave overtopping computations       | <input type="checkbox"/> Dune erosion computations                  |
| <input type="checkbox"/> Primary Frontal Dune Assessment     | <input type="checkbox"/> N/A (area not studied by detailed methods) |

**C. REVISED ANALYSIS**

1. Number of transects in revised analysis: 3

2. Information used to prepare the revision (check all that apply):

- |   |  |
|---|--|
| <input type="checkbox"/> Wave setup analyses (complete Items 3, 4, and 5 below)           | <input type="checkbox"/> Wave overtopping assessment (complete Items 4 and 5)                            |
| <input checked="" type="checkbox"/> Stillwater elevation determinations (complete Item 3) | <input checked="" type="checkbox"/> More detailed topographic information (complete Section E)           |
| <input type="checkbox"/> Erosion considerations (complete Item 4)                         | <input type="checkbox"/> Shore protection structures (attach completed Coastal Structures Form - Form 5) |
| <input type="checkbox"/> Wave runup analysis (complete Items 4 and 5)                     | <input type="checkbox"/> Primary frontal dune assessment (complete Item 5)                               |
| <input checked="" type="checkbox"/> Wave height analysis (complete Items 4 and 5)         | <input type="checkbox"/> Other, attach basis of revision request with explanation                        |

3. Stillwater Elevation Determination

a. How were stillwater elevations determined?

- ☐ Gage analysis (If revised gage analysis was used, provide copies of gage data and revised analysis.)
- ☐ Storm surge analysis
- ☒ Other (Describe): Average of Transects 2 & 4 from Monroe County FIS (2005)

b. Specify what datum was used in the calculations: NGVD29

If not the FIS datum, have the calculations been adjusted to the FIS datum? ☐ Yes ☐ No Conversion factor: \_\_\_\_\_

c. Was the storm surge analysis revised? ☐ Yes ☒ No

d. If a new storm surge model was used, attach a detailed description of the differences between the current and the revised analyses, and why the revised analysis should replace the current analysis.

**C. REVISED ANALYSIS (continued)**

- e. If wave setup was computed, attach a description of methodology used.  
Amount of wave setup added to stillwater elevation: 1.5 feet

**4. Revised Analysis (i.e., erosion, wave height, wave runup, primary frontal dune, and wave overtopping)**

If DHS-FEMA procedures were utilized to perform the revision, attach a detailed description of differences between the current and the revised analyses, and why the revised analysis should replace the current analysis.

If DHS-FEMA procedures were not utilized to perform the revision, provide full documentation on methodology and/or models used; including operational program, detailed differences between methodology and/or models utilized and DHS-FEMA's methodology and/or models. Also, attach an explanation of why new methodology and/or models should replace current methodology and/or models.

If revision reflects more detailed topographic information and fill has been/will be placed in a V Zone, and is not protected from erosion by a shore protection structure, provide a detailed description of how the fill has been treated in the revised analysis.

**5. Wave Runup, Wave Height, And Wave Overtopping Analysis**

Wave height analyses along a transect are greatly affected by starting wave conditions that propagate inland. Wave runup and overtopping analyses are typically considered when wave heights and/or wave runup are close to or greater than the crest of shore protection structures or natural land forms.

- a. Was an analysis performed to determine starting wave height and period for input into WHAFIS?

If Yes, attach an explanation of the method utilized. If No, explain why these analyses were not performed.

☒ Yes ☐ No

- b. Was wave setup included in wave height analysis and removed for erosion and wave runup analyses?

☒ Yes ☐ No

- c. Was an overtopping analysis performed for any coastal shore protection structures or natural land forms that may be overtopped?

☐ Yes ☒ No

If Yes, attach an explanation of the methodology utilized and describe in detail the results of the analysis.

If overtopping was not analyzed, attach an explanation for why these analyses were not performed.

**D. RESULTS**

1. Stillwater storm surge elevation: 6.6 feet NGVD Datum

2. Wave setup: 1.5 feet

3. Starting deep-water significant wave condition:

height: 33.1 period: 12.3

4. Maximum wave height elevation: 0' contour- 12.4 feet

5. Maximum wave runup elevation: n/a feet

6. Estimated amount of maximum overtopping: n/a cfs/feet

7. Has this revision changed the Limit of Moderate Wave Action (LiMWA)? ☐ Yes ☒ No ☐ N/A

8. The areas designated as coastal high hazard areas (V Zones) have:  
☐ increased ☒ decreased ☐ both

Attach a description where they have increased and/or decreased.

9. As a result of the revised analyses, the V Zone location has shifted a maximum of 288 feet seaward and 0 feet landward of its existing position.

10. Does this revision reflect the location of the primary frontal dune?  
☐ Yes ☒ No

11. The Base Flood Elevations have:  
☐ increased ☒ decreased

a. What was the greatest increase? n/a feet

b. What was the greatest decrease? 3 feet

12. The special flood hazard area has:  
☐ increased ☐ decreased ☐ both

Attach a description where it has increased or decreased.

**NO CHANGE IN SPECIAL FLOOD HAZARD AREA**

**E. MAPPING REQUIREMENTS**

A certified topographic map must be submitted showing the following information (where applicable): effective, existing conditions, and proposed conditions 1%-annual-chance floodplain boundaries, revised shoreline due to either erosion or accretion, location and alignment of all transects, correct location and alignment of any structures, current community easements and boundaries, boundary of the requester's property, certification of a professional engineer registered in the subject State, location and description of reference marks, and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the existing or proposed conditions floodplain boundaries to be shown on the revised FIRM must tie-in with the effective floodplain boundaries. Please attach a copy of the current FIRM annotated to show the revised 1%-annual-chance floodplain boundaries that tie-in with effective 1%-annual-chance floodplain boundaries along the entire extent of the area of revision.